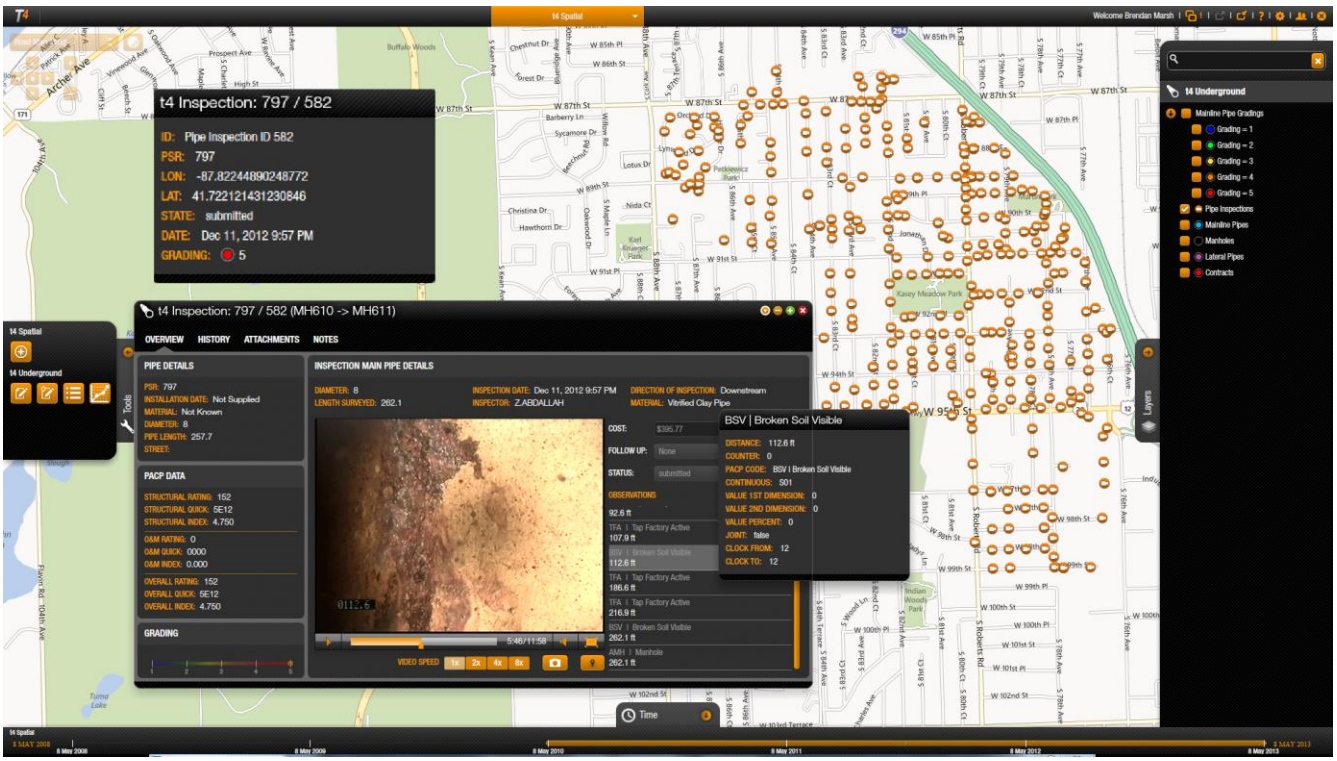
t4 Spatial

Underground

Instruction Manual



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Introduction

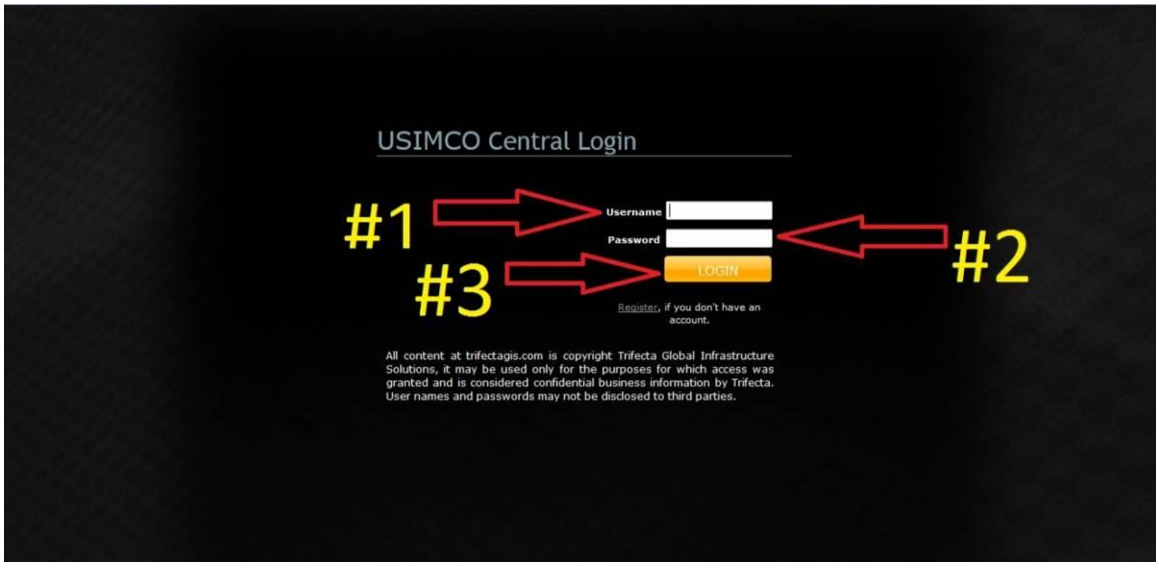
Welcome to a new way of storing, reviewing, and analyzing your sewer inspection project. t4 Underground's cloud based software and storage allows for instant access to your data online available anytime, anywhere! No more searching through piles of paperwork or hours of video. Now you have been empowered to make better decisions by being able to view all of your videos, inspection data, and status reports on one viewable source.

1 Getting Started

Copy and paste the following to the address bar of your internet browser:

http://underground.t4spatial.com

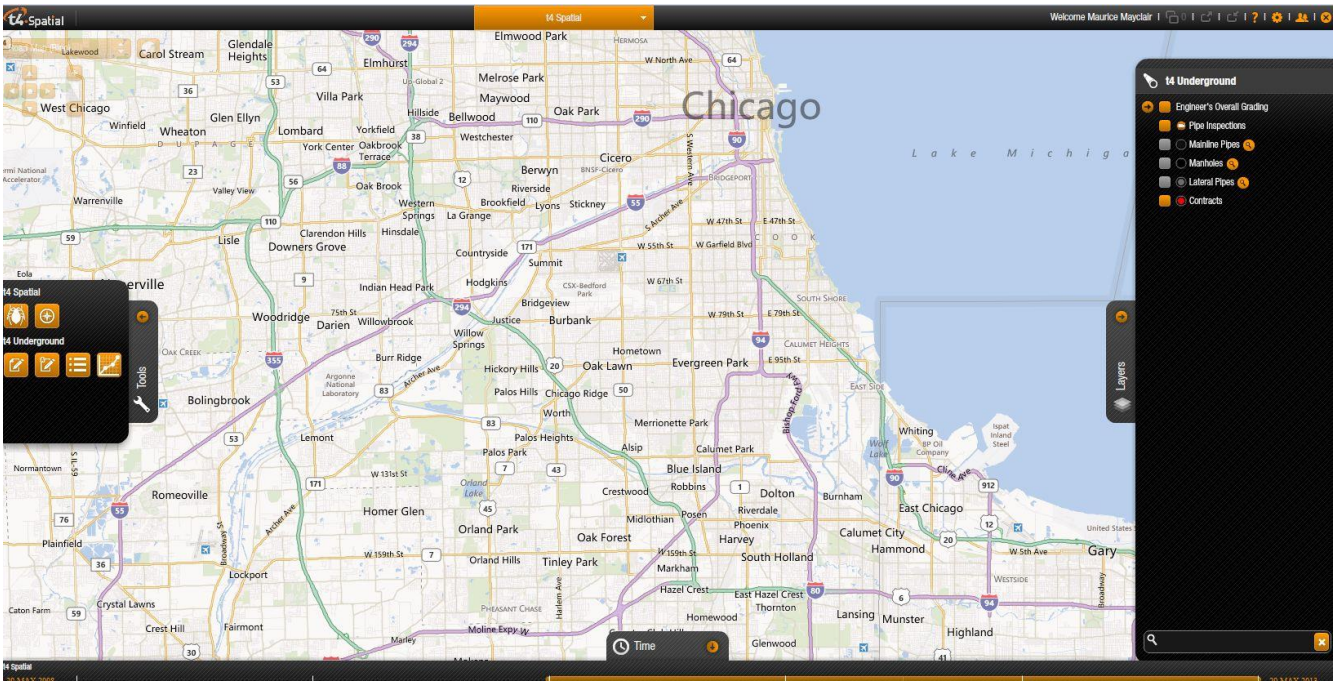
This will bring you to the t4 Underground log in page. If you do not already have a username and password, please contact t4 Spatial at (805) 921 3000 or email us at info@t4spatial.com.


USIMCO Central Login
#1
Username
Password
#2
LOGIN
#3
Register, if you don't have an account.
All content at trifectagis.com is copyright Trifecta Global Infrastructure Solutions, it may be used only for the purposes for which access was granted and is considered confidential business information by Trifecta. User names and passwords may not be disclosed to third parties.

Please enter your ***Username/Login*** in box #1, and your ***Password*** in box #2. Once you have correctly entered them, click on the **LOGIN** button (#3)

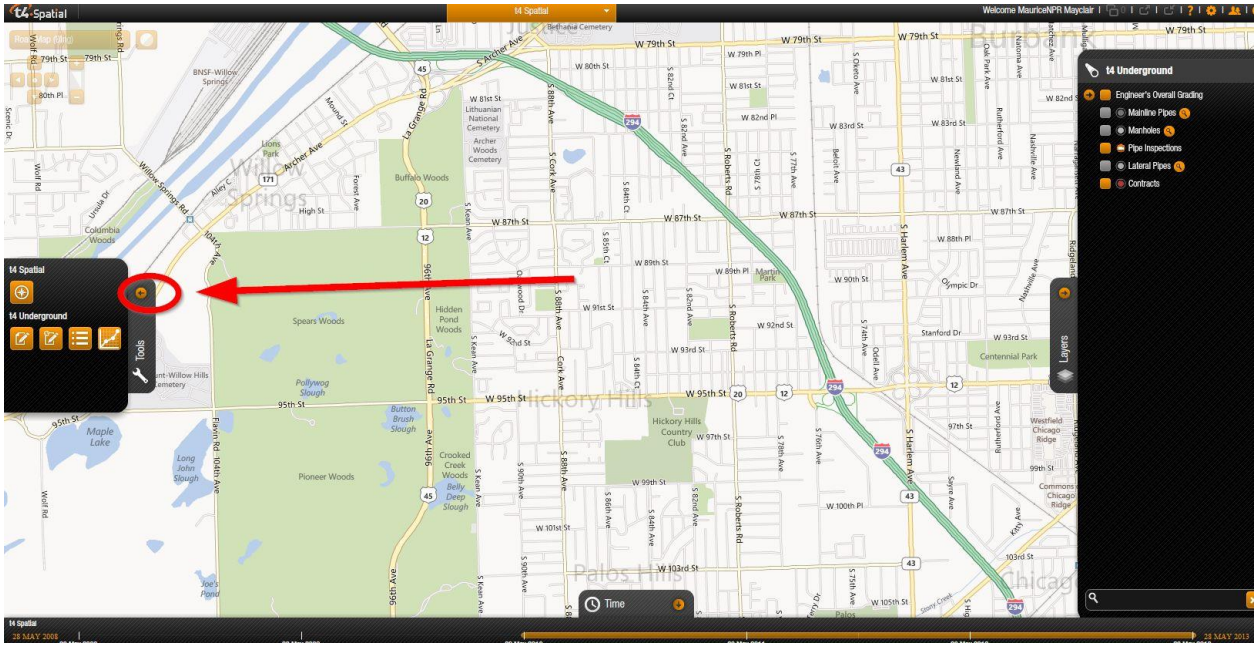
.

Immediately after logging in, you will see the t4 logo at the center of the screen. This will indicate that you have logged in properly and your session is beginning to load.



Once fully loaded, you will be presented with an interactive map and three collapsible tabs: ***Tools, Layers*** and ***Time***. You will also notice your name in the upper right hand corner of the software. Alongside your name you will find an orange circle with an "x". This is the ***Logout*** button. Clicking on this will log you out and return you to the login screen.

2 The Tools Tab

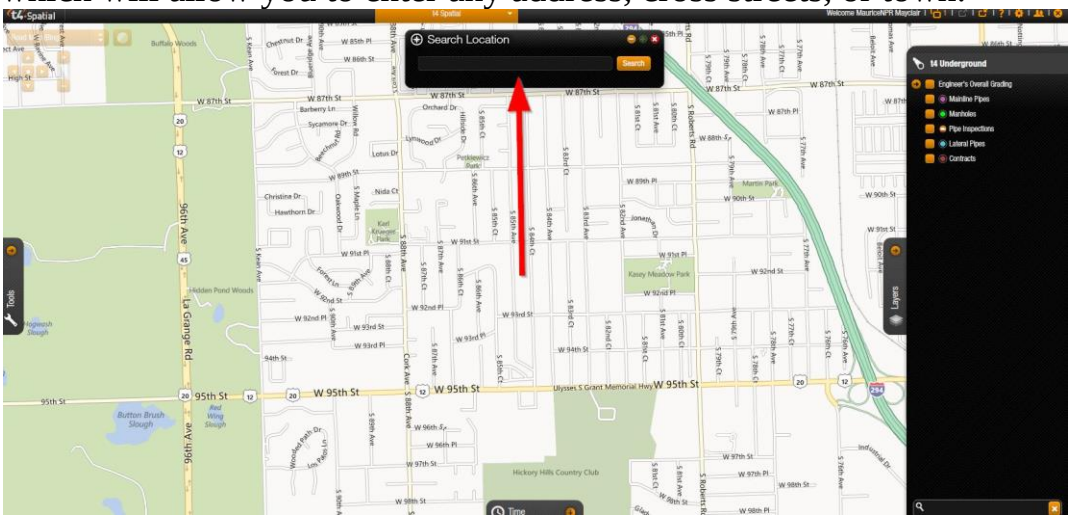


Located to the immediate left hand side of the screen you will find the ***Tools*** tab. Clicking on the circled arrow will hide the tab from sight. Clicking again on the arrow will fully extend the tab. You will find that the tab has 2 titles with five symbols. The top title is "t4 Spatial".

2.1 T4 Spatial Tools

Clicking on this symbol

immediately closes the ***Tools*** tab and brings up a search location which will allow you to enter any address, cross streets, or town.



After entering the location, click on the search button and the map will relocate to the entry. Clicking on the Red circle with the white "x" will close this tab.

2.2 T4 Underground Tools

Next on the Tools tab you will find four buttons in a single line.

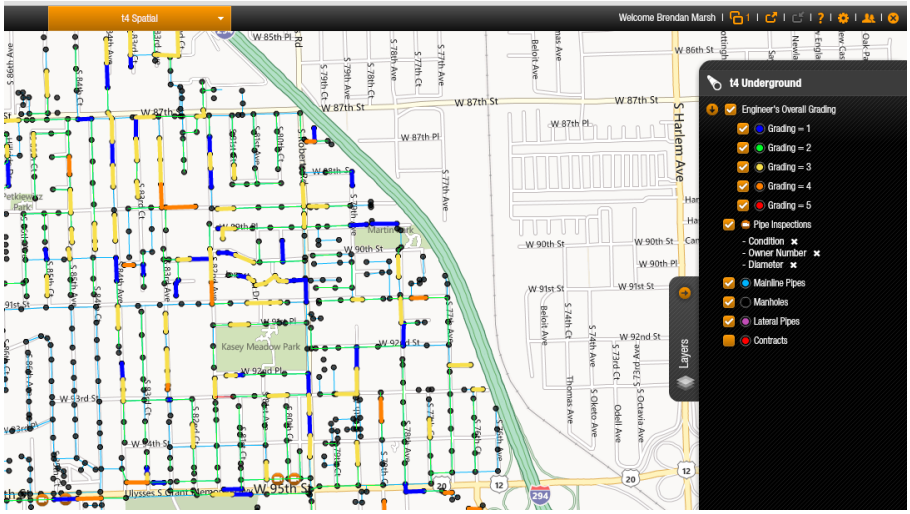
The first button - is the ***Contract List***. When clicked will close the tools tab and open up the list of contracts that are available under your login.

The second button - is the ***Contract Wizard*** and is used when setting up contracts as a contract manager.

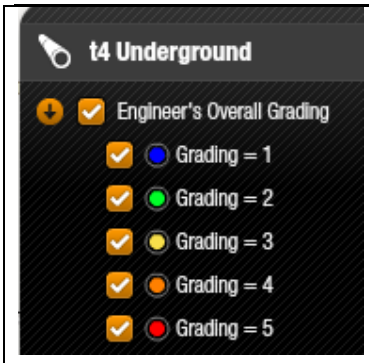
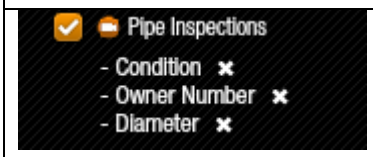
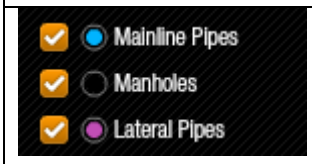
The third button - is the ***Inspection List***. When clicked will close the tools tab and open up the list of inspections that are available under your login.

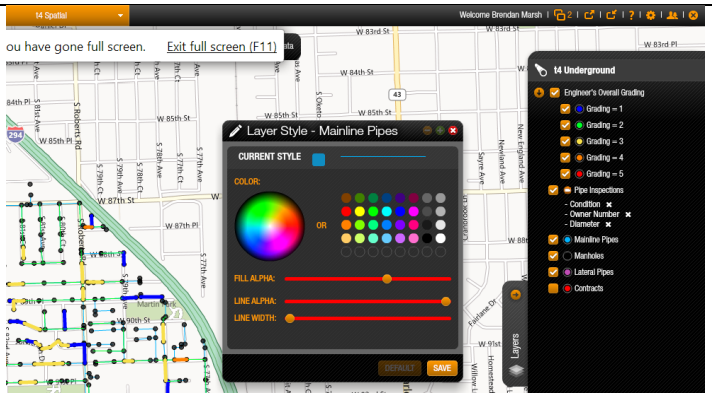
The last button - is the ***Report List***. When clicked will open up the list of any previously saved Contract and Inspection List reports that are available to you.

2.3 T4 Map Layers



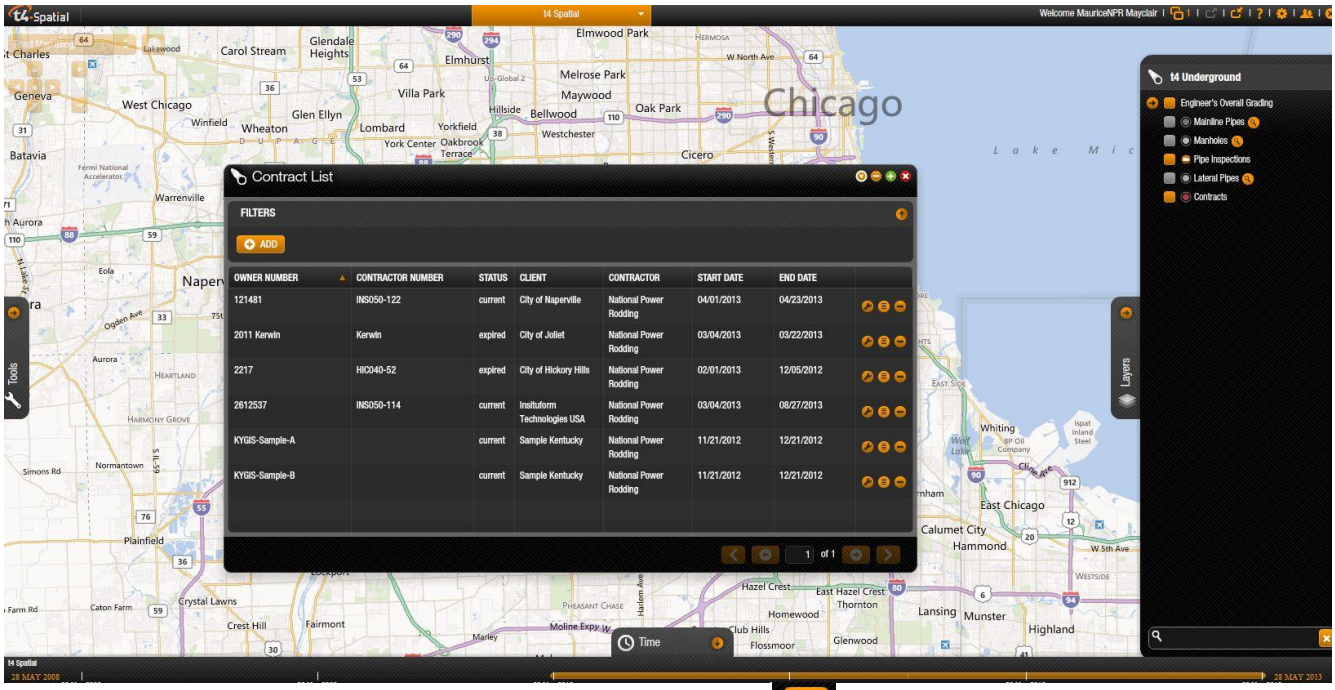
The records in t4 Underground can be displayed as layers on the map and individually configured. By default t4 Spatial have set up the following layers.

	***Engineers Overall Grading*** Is the editable value assigned to a pipe segment based on the inspection data and defaulted from the PACP recommendation. t4 Underground treats each Index Grading value as a discrete layer which allows users to view this data separately (or together). The default colors for these layers are taken from the NASSCO specifications but are editable by users.
	***Pipe Inspections*** This layer highlights the location of video inspections within the system with notation about which filters are currently applied within the Inspection List. Filters can be removed from here (click on the white X) but not edited.
	***GIS Pipe Network Records*** These three layers will (where provided) show the GIS records provided by asset owners to provide context to the inspection data.
	Contracts This layer shows the security jurisdiction of various inspection contracts and allows users to open those records. Where no GIS data has been provided inspections will be loaded to the center of these polygons.



By clicking on the colored circle to the left of each Layer Name is possible to change the color and size of each layer item. These changes are individual to each users and will remain the next time you log in.

3 The Contract List

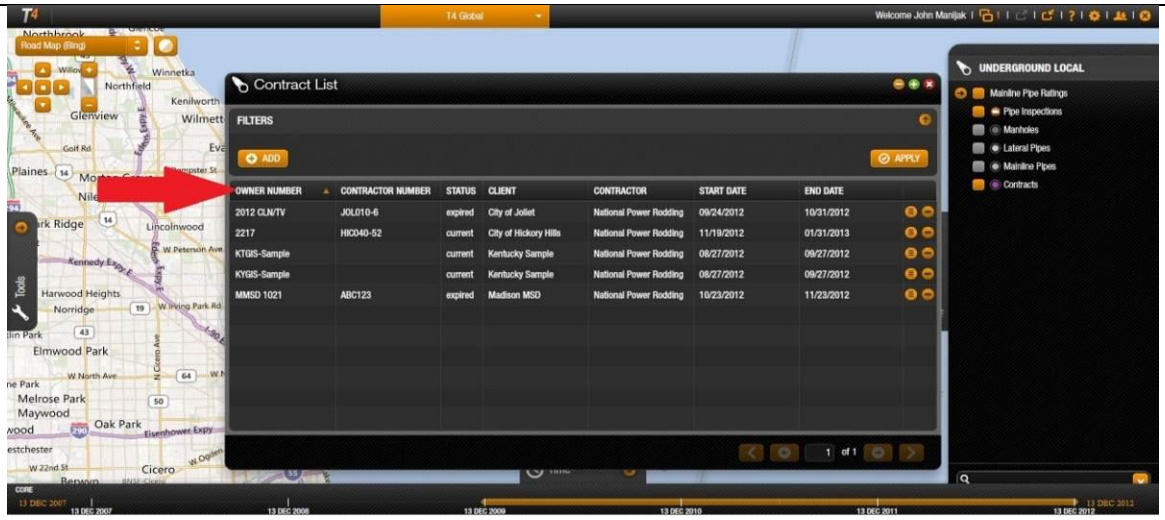


Upon clicking on the ***Contract List*** shortcut button , t4 Underground brings up the list of contracts available under your login.

Contract identifiers include

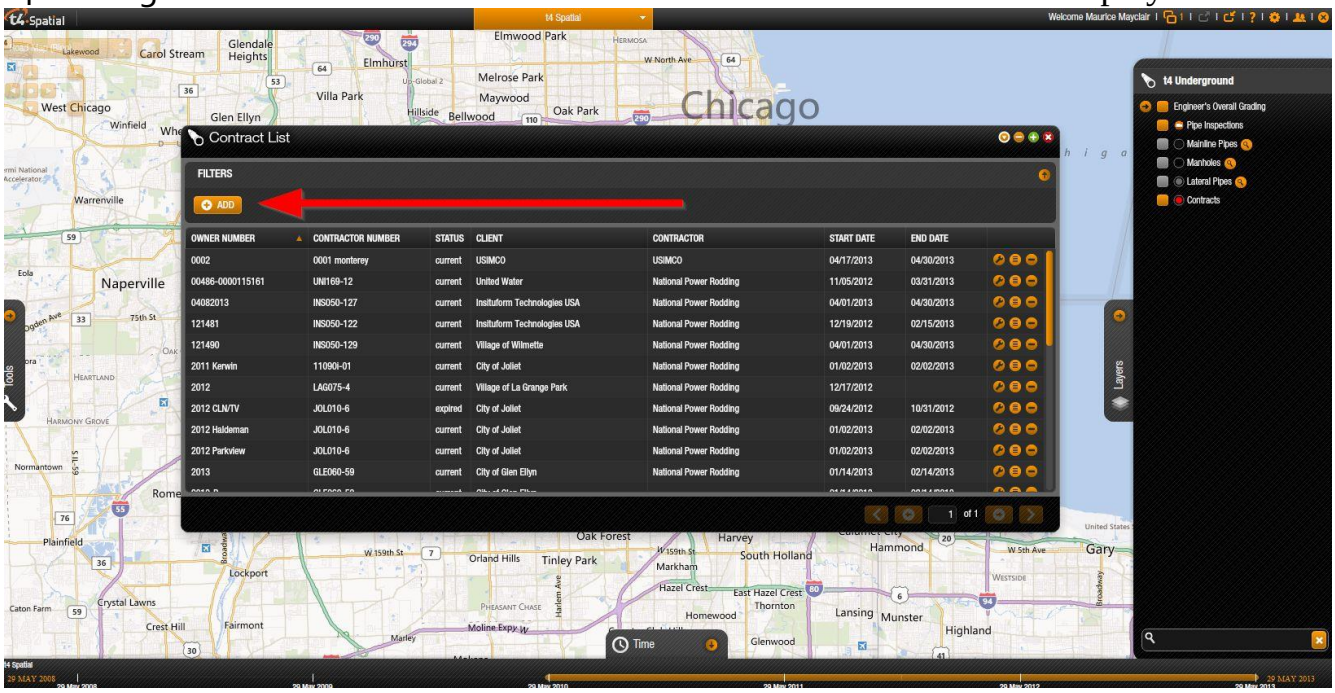
- ***Owner Number***
- ***Contractor Number***
- ***Status, Client***
- ***Contractor***
- ***Start Date***
- ***End Date***.

The list of contracts can be sorted in the order of identifiers that you choose.

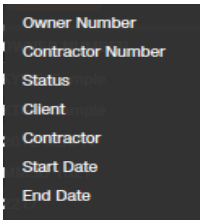


For example, if you want to view the list of contracts by ***Start Date***, click on the column header "***Start Date***". This will sort the list of contracts by ***Start Date***.

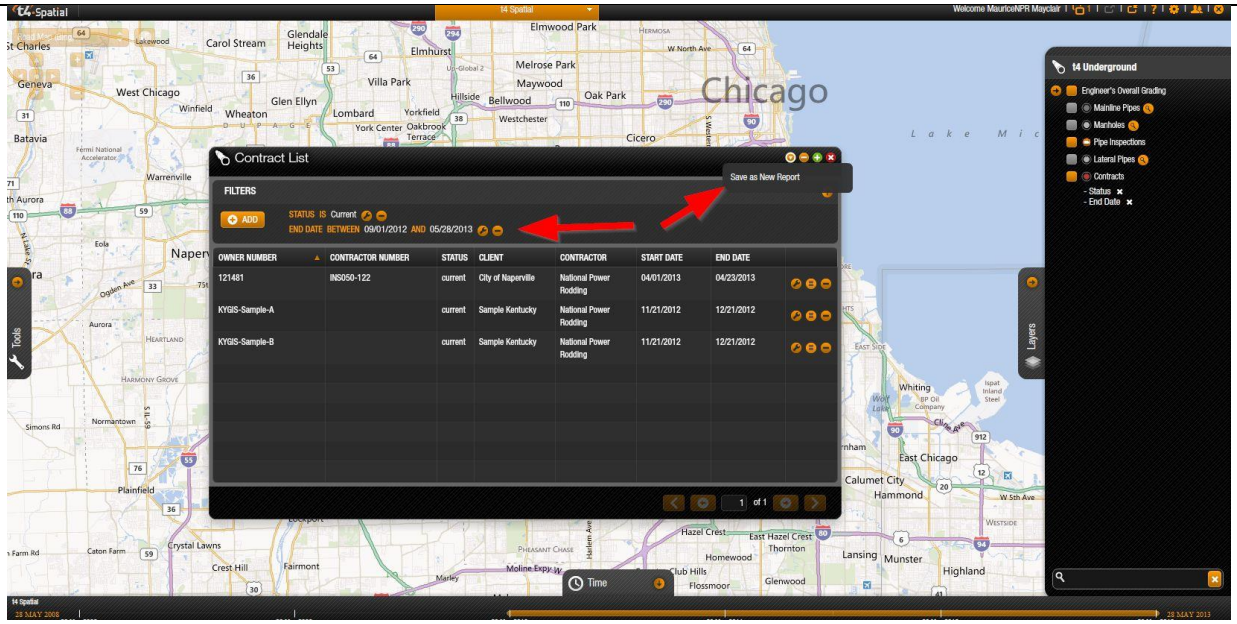
t4 Underground also allows for the user to set filters on the line items displayed.



By clicking on the ADD button, a list of indexes



drops down. By clicking on any of the items, the user is then directed to add any of a number of filters. These filter "conditions" are then listed just above the "add" button.



After each condition has been entered the filtered list is updated. To undo or change any of the filter items, locate the two buttons alongside each condition. The "wrench" button allows the user to change the item while the "minus" button will eliminate the filter item altogether.

While viewing any list of contracts you can save the filter as a report by clicking on the Context Menu and "Save as New Report".

Once you have found the contract of choice, click on the list button to display inspections associated with that contract.

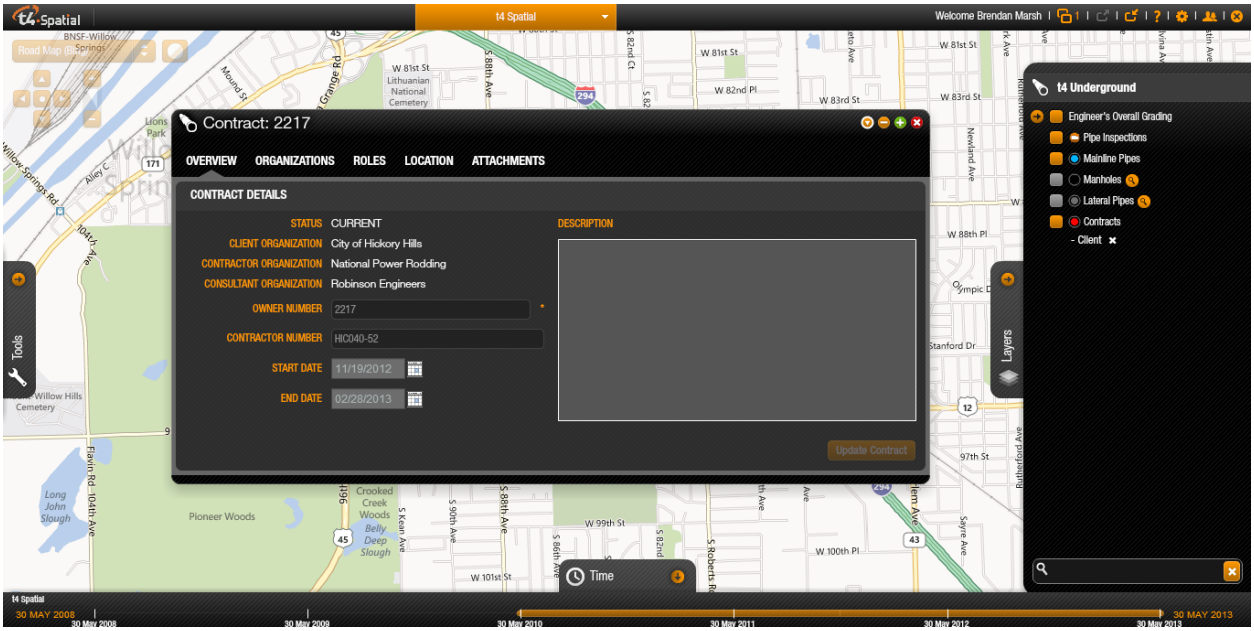
Click on the "wrench" button or double click elsewhere on the row to open the Contract page.

4 Contract Page

The contract page offers a full description of the contract. There are five tabs available at the top of the page:

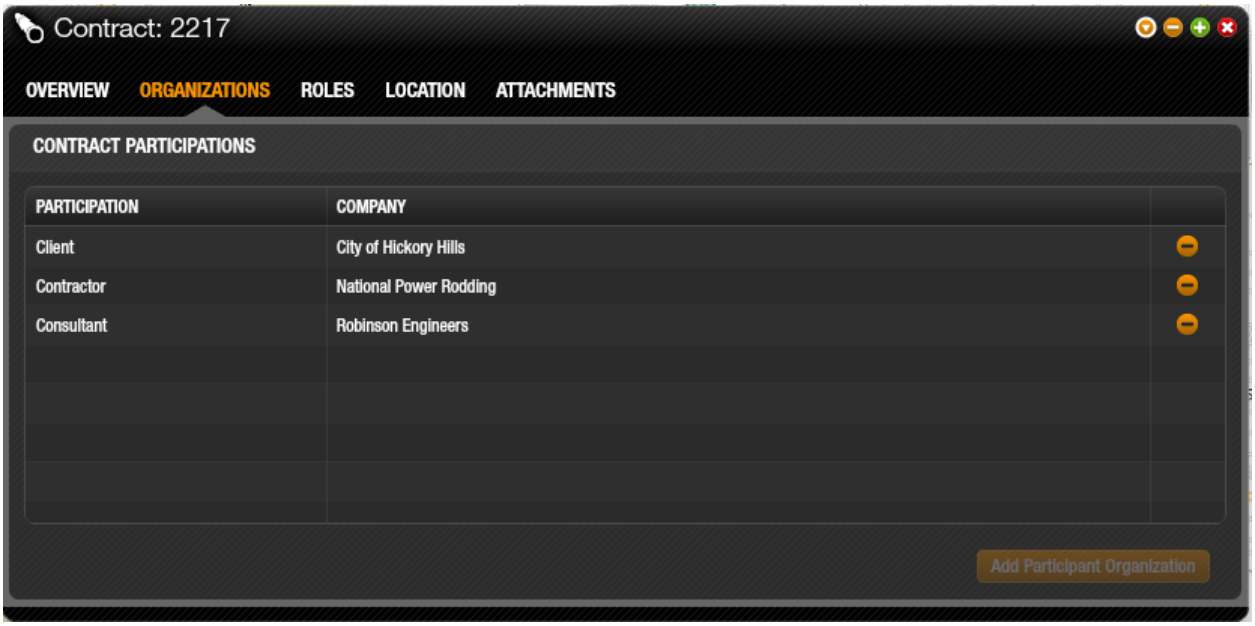
- ***Overview***
- ***Organizations***
- ***Roles***
- ***Location***
- ***Attachments***

4.1 Overview Tab



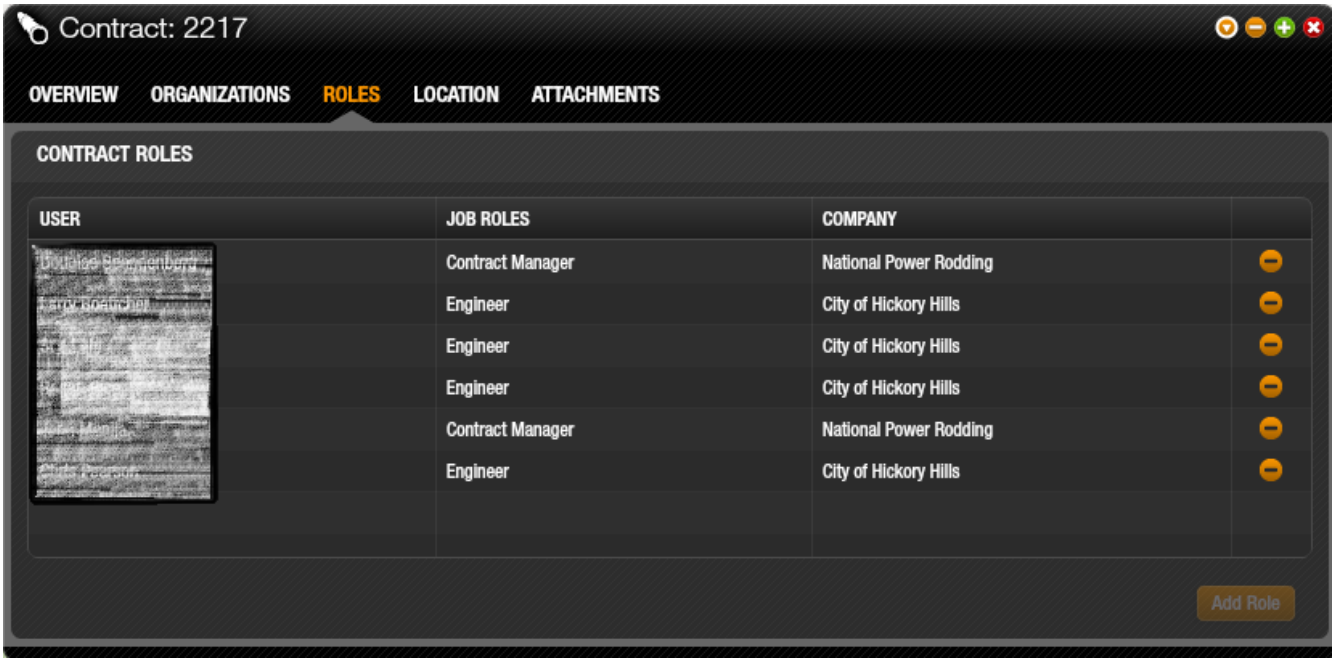
The Overview tab offers the Status of the contract, the Client, the Contractor, as well as the Starting and Ending dates.

4.2 Organizations Tab



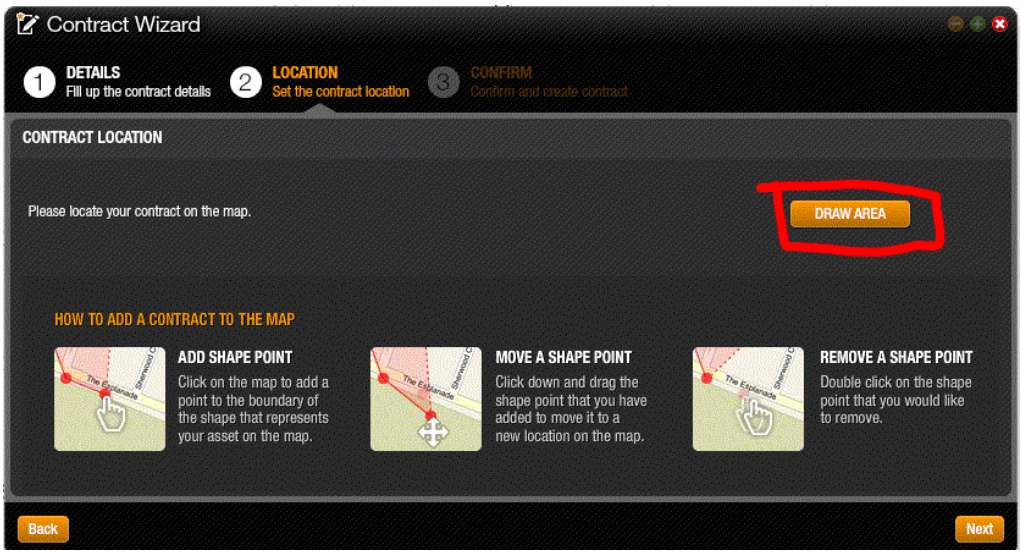
The contract Organization tab offers information on the active organizations associated with this contract. All users who are members of these organizations will automatically be granted Read Only access to the inspections within it. Elevated edits rights are only granted to those users explicitly named on the following tab <Roles>.

4.3 Roles Tab

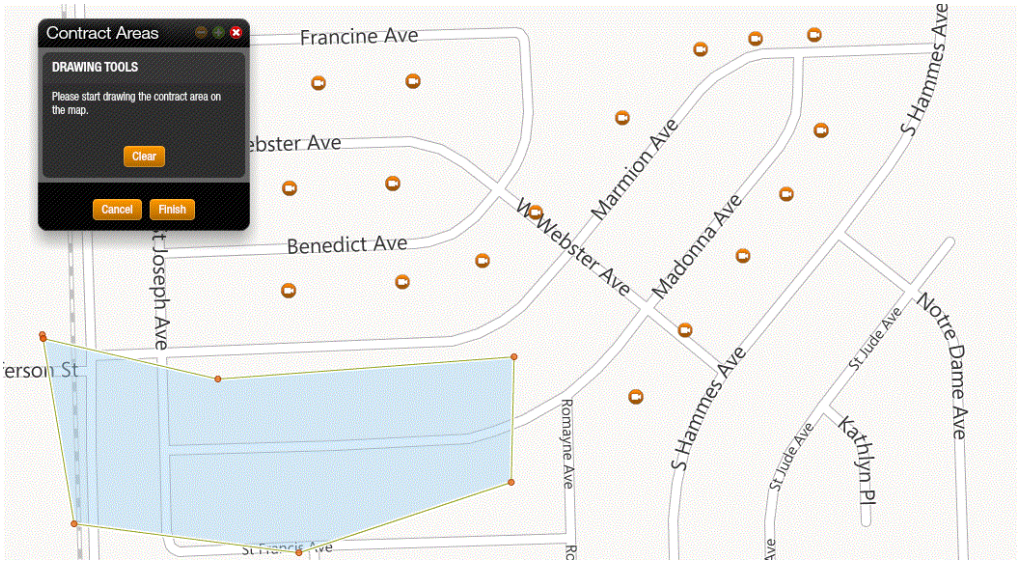


The contract Roles tab offers information on the active users and their roles (or level of activity) within this particular contract. Those with Engineer role can add basic data to the inspection record such recommended follow up actions. Those with Contract Manager role can perform all Engineer actions as well as administering users and editing financial information.

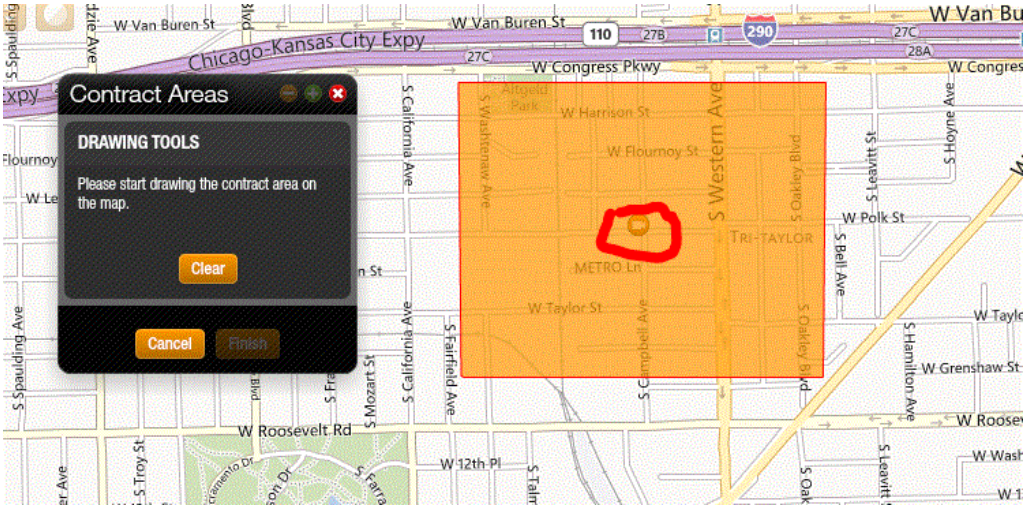
4.4 Location Tab


Contract Wizard
1 DETAILS
Fill up the contract details
2 LOCATION
Set the contract location
3 CONFIRM
Confirm and create contract
CONTRACT LOCATION
Please locate your contract on the map.
DRAW AREA
HOW TO ADD A CONTRACT TO THE MAP
ADD SHAPE POINT
Click on the map to add a point to the boundary of the shape that represents your asset on the map.
MOVE A SHAPE POINT
Click down and drag the shape point that you have added to move it to a new location on the map.
REMOVE A SHAPE POINT
Double click on the shape point that you would like to remove.
Back
Next

Each contract can have an area or location defined for it. This helps us import records in the t4 Underground software when GIS files are unavailable.

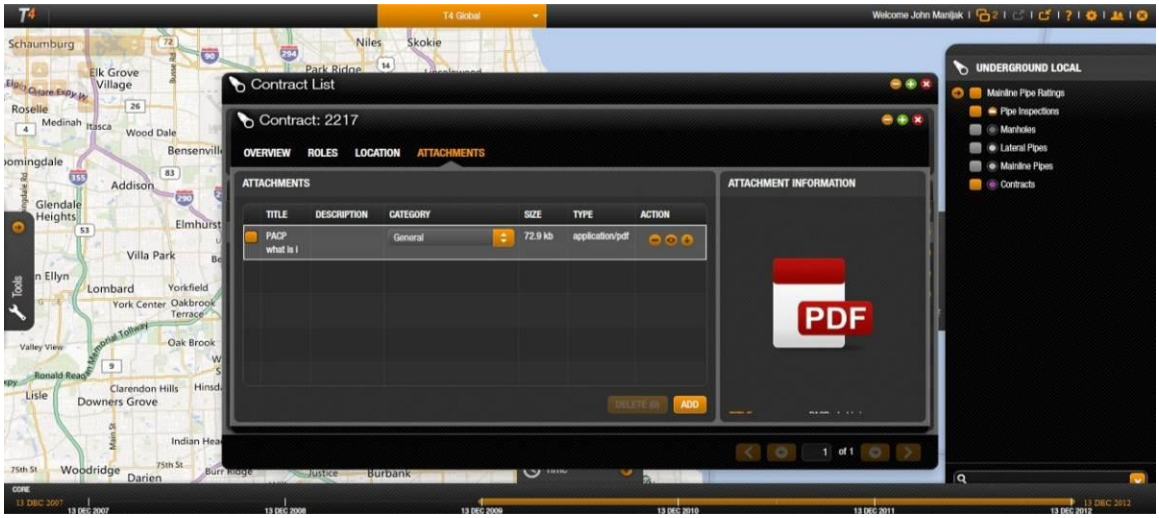


The Drawing tool is operating by adding a single click to add a new point to the polygon and a double click to ‘close’ the polygon when complete.



Once the contract has been fully drawn you can select the ***Finish*** option return to the contract screen.

4.5 Attachments Tab



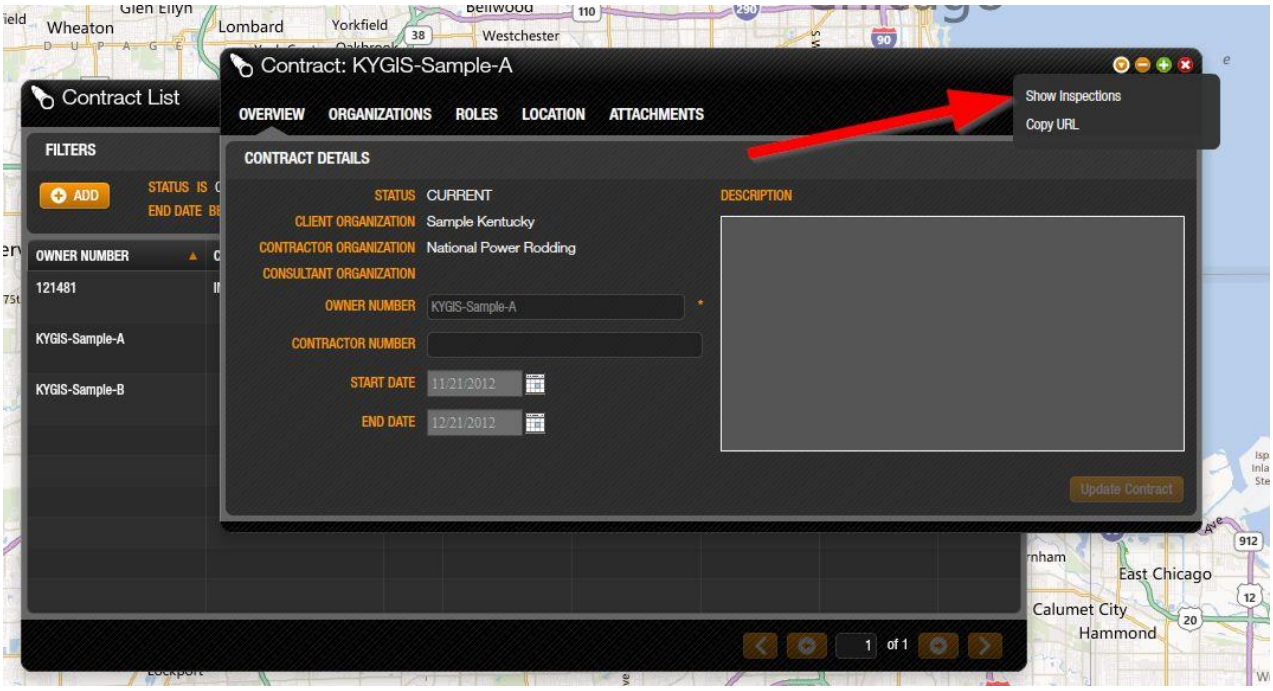
The contract Attachments tab allows for users to add such items as contract books, change orders, specifications, maps, work orders, and invoices. All items are available for viewing or download.

To add an item, simply click located near the bottom right side.
To view an item, simply click located in the Action column on the right side.
To download an item, simply click also located in the Action column.

When you want to exit the contract tab click on found at the top right of the menu.

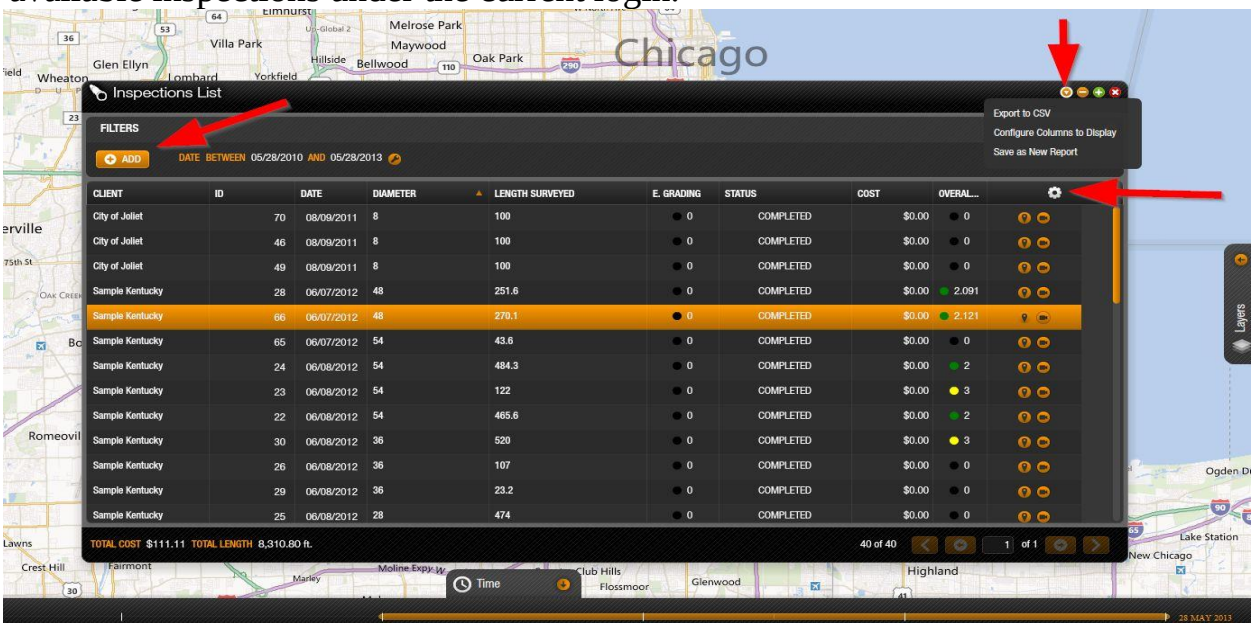
4.6 Show Inspections

While viewing any contract you can switch to a view of all inspections for that contract by clicking on the Context Menu and “Show Inspections”.



5 The Inspections List

Located on the Tools tab is the Inspections list button. Clicking on this will bring up all available inspections under the current login.



This is a current list of all inspections available for review. There are several columns with information available for immediate review. To the right of all the columns is a ***"cog",*** clicking this allows you to configure columns to display. As mentioned earlier when describing the ability to sort the columns of the contracts, the inspections list can also be sorted by clicking on the column of choice. For example, inspections can be sorted according to gradings by clicking on the Grading header.

It is important to note that there may be more than one page of information available for review. By looking at the bottom right of the page you will notice the total number of inspections available as well as the total number of pages.

If you want to download the filtered or non-filtered inspection list, click the options button located at the top right hand side of the list and then "Export to CSV". This will save the current filter results to your hard drive in a .csv file, which can be opened by using Excel.

Note: Some of the above features may be disabled for non-commercial users

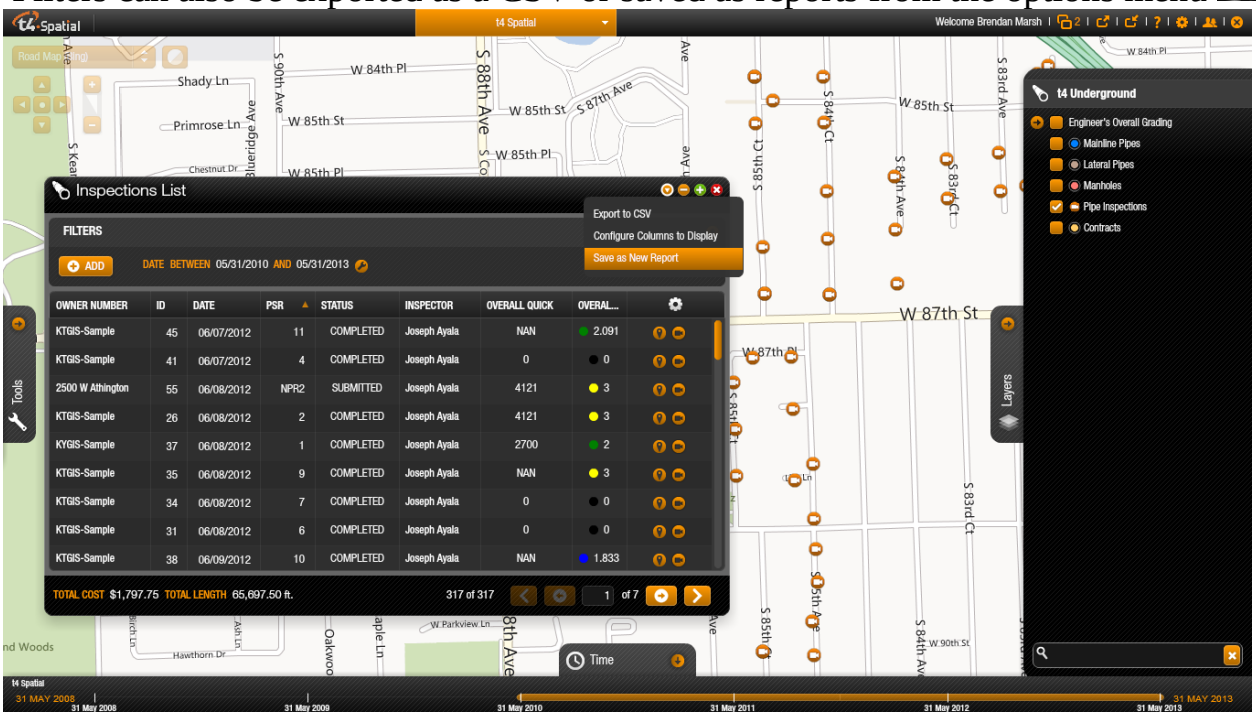
5.1 Filtering Records

Filters may be desired to review only certain inspections on contracts, purchase orders, status, etc. Filtering as described earlier can be applied by clicking the ADD button located near the top left of the inspection list. As each filter is added it will apply and display only those inspections that meet the criteria. To undo or change any of the filter items, locate the two buttons alongside each condition. The "wrench" button allows the user to change the item while the "minus" button will eliminate the filter altogether.

Of particular note is the ability to filter "Condition" or "NASSCO Observation Code". Users can select individual codes or families of codes to filter for only pipe segments containing, for example, roots or continuous cracking to focus their evaluations much more efficiently.

5.2 Reports

Filters can also be exported as a CSV or saved as reports from the options menu

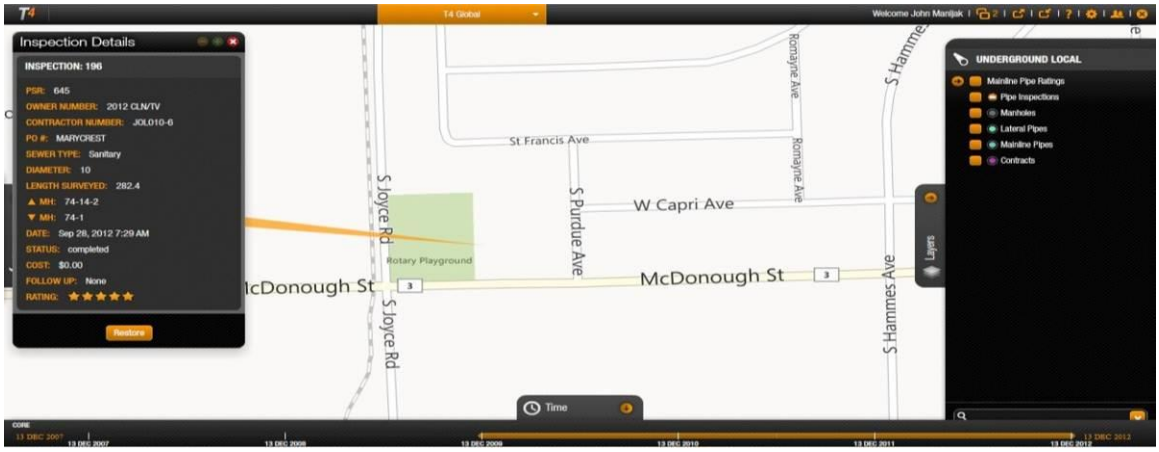

Inspections List
FILTERS
ADD
DATE BETWEEN 05/31/2010 AND 05/31/2013
Export to CSV
Configure Columns to Display
Save as New Report
OWNER NUMBER | ID | DATE | PSR | STATUS | INSPECTOR | OVERALL QUICK | OVERAL...
KTGIS-Sample | 45 | 06/07/2012 | 11 | COMPLETED | Joseph Ayala | NAN | 2.091
KTGIS-Sample | 41 | 06/07/2012 | 4 | COMPLETED | Joseph Ayala | 0 | 0
2500 W Athington | 55 | 06/08/2012 | NPR2 | SUBMITTED | Joseph Ayala | 4121 | 3
KTGIS-Sample | 26 | 06/08/2012 | 2 | COMPLETED | Joseph Ayala | 4121 | 3
KYGIS-Sample | 37 | 06/08/2012 | 1 | COMPLETED | Joseph Ayala | 2700 | 2
KTGIS-Sample | 35 | 06/08/2012 | 9 | COMPLETED | Joseph Ayala | NAN | 3
KTGIS-Sample | 34 | 06/08/2012 | 7 | COMPLETED | Joseph Ayala | 0 | 0
KTGIS-Sample | 31 | 06/08/2012 | 6 | COMPLETED | Joseph Ayala | 0 | 0
KTGIS-Sample | 38 | 06/09/2012 | 10 | COMPLETED | Joseph Ayala | NAN | 1.833
TOTAL COST $1,797.75 TOTAL LENGTH 65,697.50 ft.
317 of 317
1 of 7
t4 Underground
Engineer's Overall Grading
Mainline Pipes
Lateral Pipes
Manholes
Pipe Inspections
Contracts
Tools
Layers
Time
W 84th Pl
W 85th St
W 87th St
W 87th Pl
S 88th Ave
S 87th Ave
S 84th Ct
S 83rd Ave
S 83rd Ct
S 85th Ct
S 85th Pl
S 84th Ave
W 90th St
Shady Ln
Primrose Ln
Chestnut Dr
W Parkview Ln
Hawthorn Dr
31 MAY 2008
31 May 2009
31 May 2010
31 May 2011
31 May 2012
31 MAY 2013

The user is given the option to choose a name for the report and it is then saved ot the Reports menu on the left hand tab of the application window as highlighted below.

From the Reports Menu the user can Run the Report, Share it (copies the report URL directly to the clipboard so it can be pasted into an email or similar; or Delete it.

5.3 Reviewing Data

Locating at the right hand side of every inspection are two symbols. The first button (***location pointer***) allows the user to locate the inspection on the overall map, while the second button (***video review***) allows the user to review the video and data reports. When clicking on the ***location pointer,*** t4 Underground will close the inspection list and zoom to the position on the map as to where the inspection took place.



The Inspection Details tab will be located on the left hand side of the screen. Contained on the tab are various descriptive items such as PSR number, Pipe Size, Grading, etc.

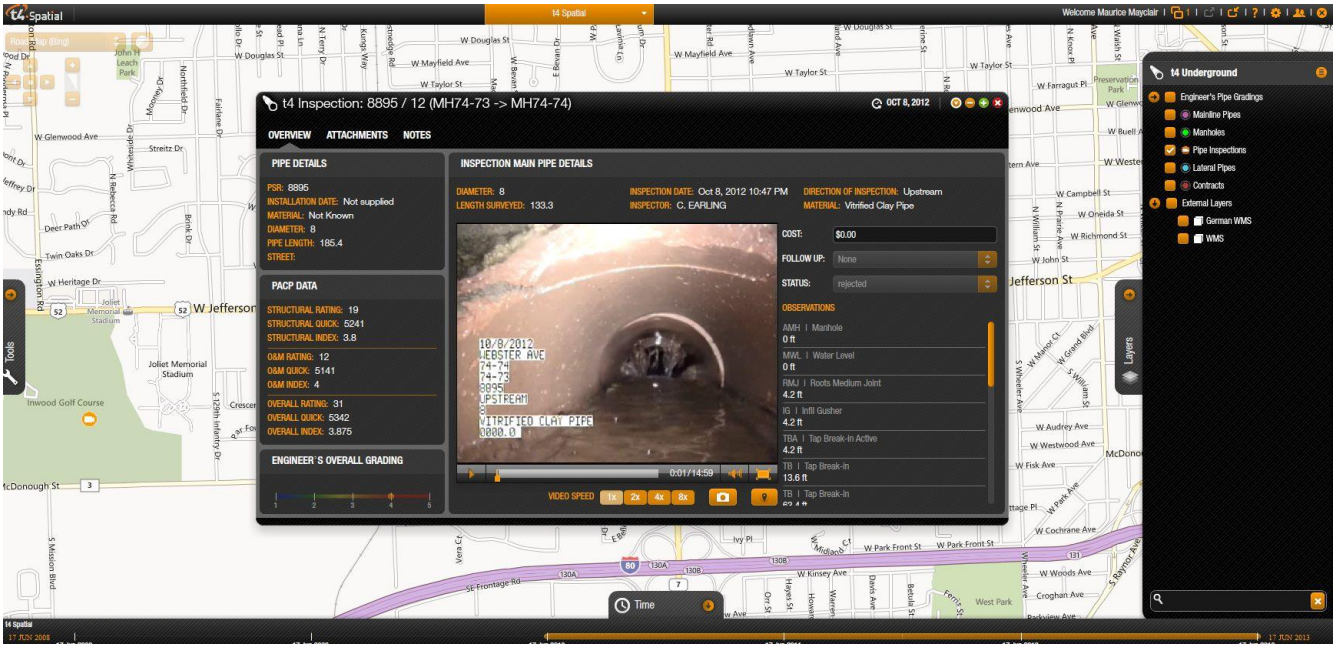
We will cover map adjustments later. By clicking

on the Inspection Details tab, you will be returned to the Inspection List.

5.4 Video Review

The ***Video Review*** button appears in two different areas of the t4 Underground software. Located after every line item in the ***Inspection Details*** Tab, and as you will later see, on the map at every section of pipe inspected. Clicking on this button opens the ***t4 Underground Inspection Interface.***

6 t4 Underground Inspection Interface



This one of a kind inspection interface is unique to the t4 Underground software. There are three tabs available: ***Overview, Attachments*** and ***Notes***.

In the upper right hand corner of the t4 Underground Inspection Interface are 4 buttons. By selecting the options button, users will be presented with choices depending on security privileges ;

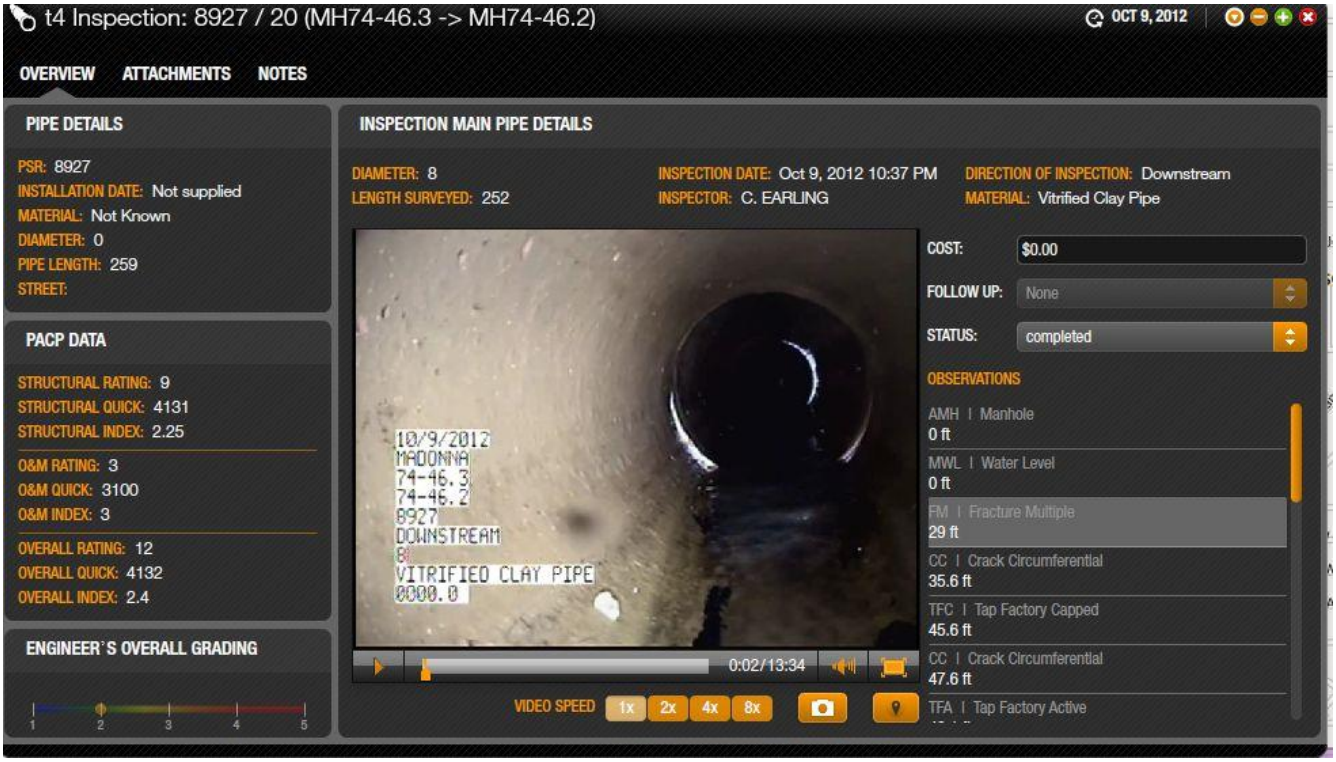
- ***Delete Inspection***
- ***PDF Report***
- ***Download Video***
- ***Move Inspection***
- ***Copy URL***

Selecting will minimize the t4 Underground Inspection Interface.

Selecting will increase the size of the t4 Underground Inspection Interface.

Selecting the close button will close the t4 Underground Inspection Interface.

6.1 Overview Tab



Located at the top left side of the inspection interface are the ***Pipe Details*** that were supplied with the shape files at the beginning of the project. Included are such items ***as Pipe Length, Diameter*** and ***Installation Date***.

To the immediate right of the ***Pipe Details*** is the ***Inspection Main Pipe Details***. This information was provided by the PACP certified operator while the inspection was performed in the field. Such items as the ***Diameter***, ***Length Surveyed***, and ***Material*** were verified by the operator and included on the inspection report.

6.1.1 The Video Player

Located just below the ***Inspection Main Pipe Detail*** is the ***t4 Underground Video Player***. Incorporating several features from other players, this unique system places them all in one place just below the video review.

The ***play/pause*** button allows the user to stop and to resume video playback.

The ***slider and time display***

shows the current location, time, and total video time. Clicking at various points on the slider allows the user to jump anywhere they choose on the video.

The ***volume control*** allows the user to adjust the playback volume independent of the computer master volume.

Clicking on the ***full screen*** button opens the video inspection to full screen.

The ***play/pause, time slider, time display, volume control*** and ***full screen*** controls are still available in full screen mode. To return to the main screen, simply hit ***"esc"*** on your keyboard or click on the ***full screen*** button located at the bottom of the page.

Video playback speed can be adjusted by choosing one of the following buttons

located just below the time slider. Video by default will play at 1x speed. After adjusting the speed the video will resume playback at the time location at which the adjustment was made.

Taking a snapshot of the video has never been easier. Click on the ***snapshot*** button located to the right of the ***video playback speed*** buttons. Once selected, the .jpeg will be saved to a location of your choice on your hard drive.

The ***location pointer*** button has been added to the player and is located next to the snap shot button.

6.1.2 The Action Center

The t4 Underground software's interactive ***Action Center*** allows for planning and feedback for authorized users.

The first field here is the Cost Field, which allows Contractors to input the charge for this particular inspection under the terms of the contract.

Just below the ***Cost Field*** is the ***Follow Up Field***. Clicking on the dropdown arrows allows for users to choose from several options for follow up. Choices made will be reflected on the ***Inspections List*** as well as the ***t4 Underground Video Player***.

Located below the ***Follow Up Center*** is the ***Status Bar***. Authorized users will have several choices based on their *project role*.

Role	Status
Contract Managers:	Completed or Submit
Engineers:	Accept or Reject

Inspection status must be submitted before the engineer is presented with the choice to accept or reject.

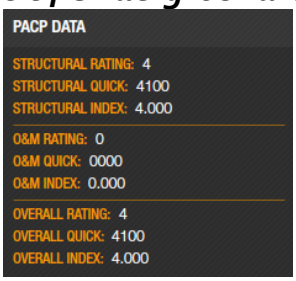
Choices made will be reflected on the ***Inspections List*** as well as the ***t4 Underground Video Player***.

6.1.3 Observations and Video Reports

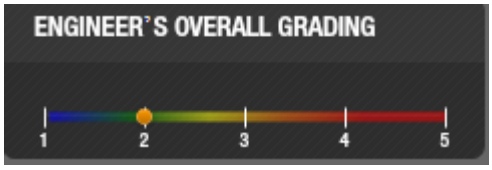
PACP 6.0 certified inspection reports have been incorporated into the ***t4 Underground Inspection Interface*** for easy review. Full downloadable reports are available in the attachments tab.
A full list of the recorded observations is located to the right of the t4 Underground Video Player. A slide down bar is located on the right side of the observations list, allowing the user to quickly and easily review all recorded observations.

PACP certified inspections allow for inspection software to issue gradings on the section of pipe inspected based on the observations reported. These are reported as one of three types: ***Structural, O&M*** and ***Overall***.

Located to the immediate left of the ***t4 Underground Video Player*** is the ***PACP Data***.



Just below the ***PACP Data*** is the ***Engineer's Overall Grading***. This editable value is defaulted from the ***PACP Overall Index*** but is editable by Engineers if they feel the rating needs to be adjusted..



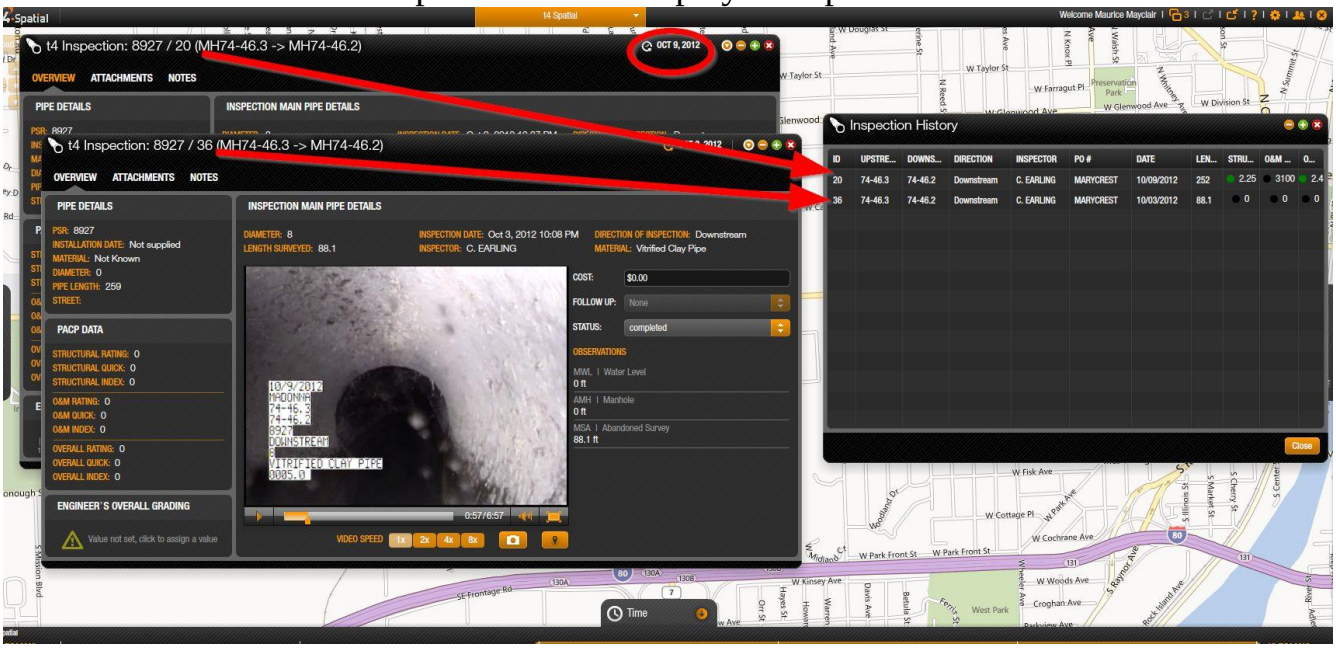
The ***Pipe Grading*** is reflected in three areas: the ***Inspections List***, the ***overall map***, and on the ***t4 Underground Video Player***. Authorized users can change the ***Grading*** based on personal choice or grading system by clicking on the value of their choosing. These changes will also be immediately reflected in all three areas.

6.1.4 Inspection Related History

The Inspection Layer map icon will indicate that an inspection has history when a count appears to the top right of the camera icon. It will indicate the number of records (over and above the most recent inspection) that are linked due to common upstream and downstream manhole data.

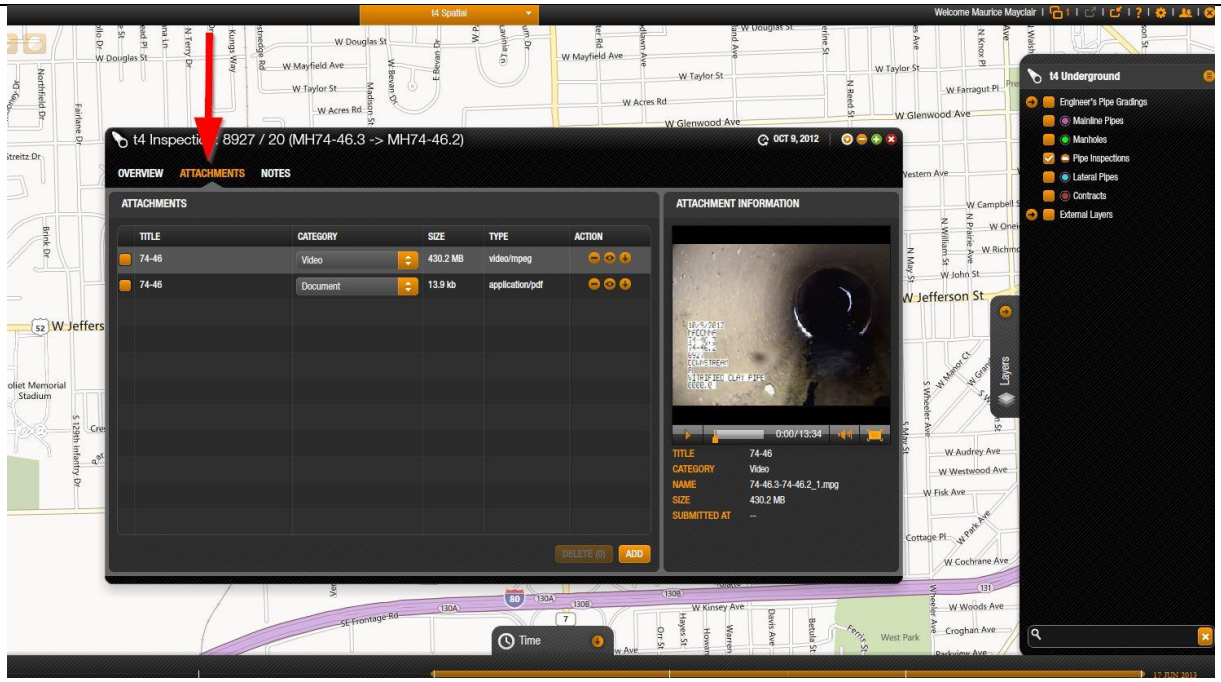
These historic records can be accessed via the main Inspection window as per the examples below. The date of the current inspection appears in the title bar

Each of the items in the dropdown can be displayed as per below.



6.2 Attachment Tab

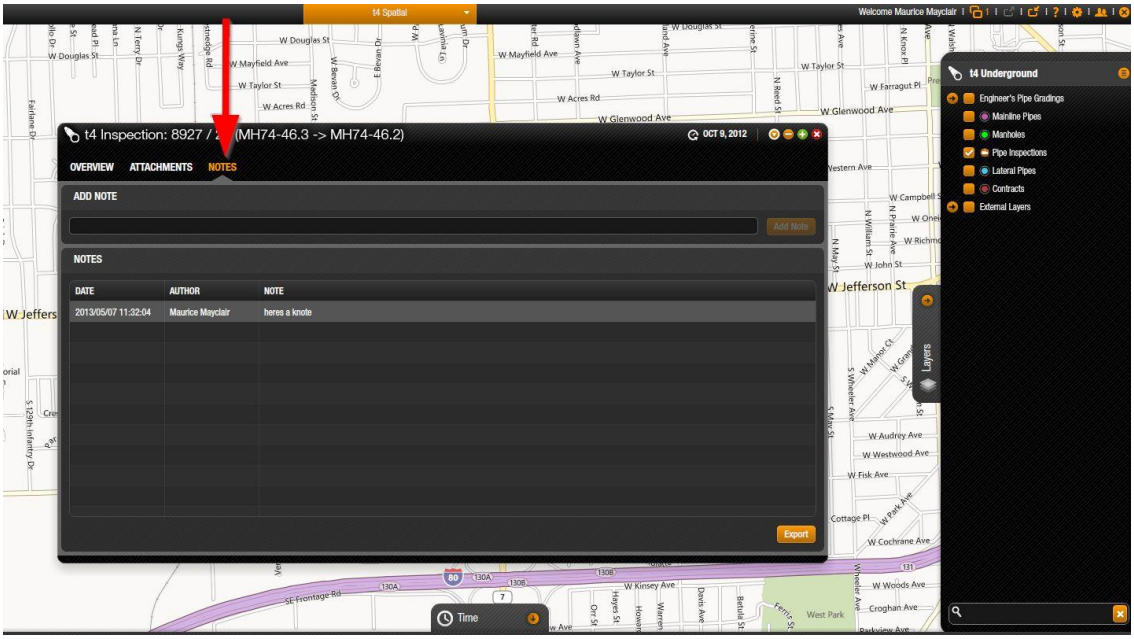
Located near the top of the ***t4 Underground Inspection Interface*** is the ***Attachments tab.***



The inspection ***Attachments*** tab allows users to ***add, view***, and ***download*** items such as the video inspection, pictures or the observation report for this individual inspection. These items are ***unique to this inspection*** and will not be available ***unless the user is reviewing this inspection***.

6.3 Notes Tab

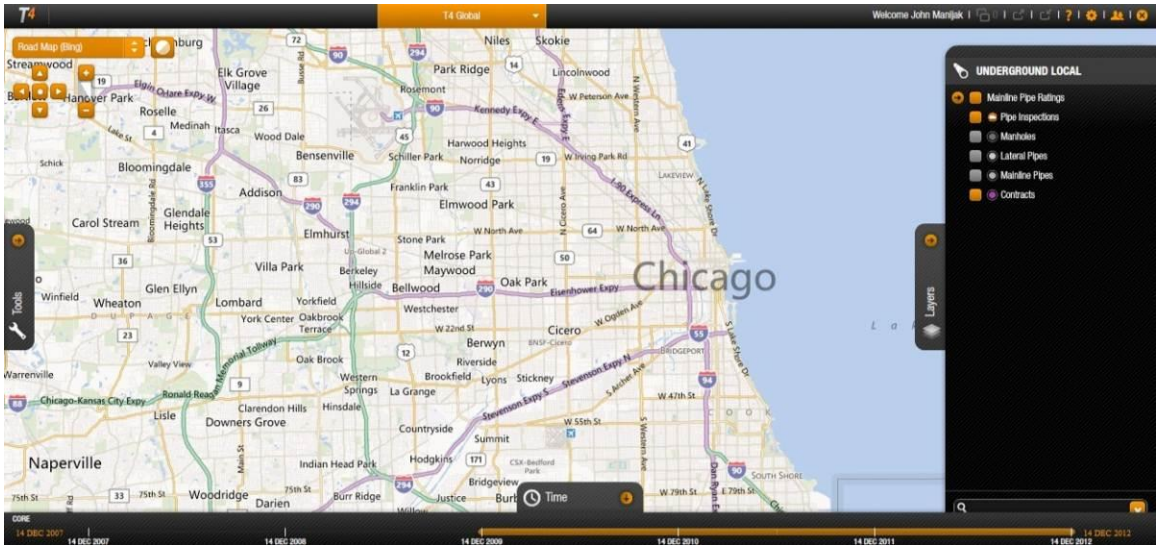
The ***Notes*** tab allows for individual users to add personal notes to the individual inspection.



Comments/Notes will be Time Stamped along with the Author's name and listed under the Notes tab. These notes can also be exported to .csv file to be shared with others by clicking on the Context Menu and selecting the ***Export Notes to CSV*** option.

By clicking on the comment section, the user can begin typing his comment. After completing the note, press the button.

7 Interactive Map



t4 Underground includes a fully functional, interactive online map.

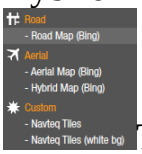
Map controls are located at the top left corner of the map.

These items may be slightly translucent. Simply sliding the mouse pointer over the area will highlight the controls.

To choose what type of map to view, click on the map dropdown

.

Users will be presented with several choices including the popular Aerial Maps and Hybrid Maps both presented by Bing.

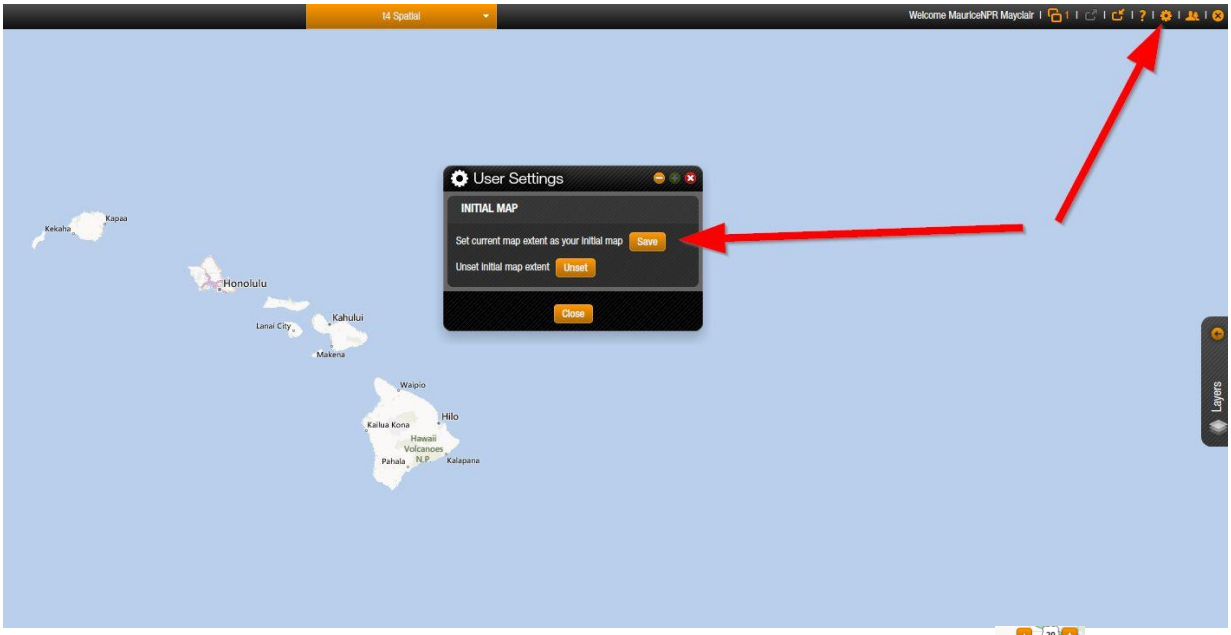


To select an individual map, simply click on your choice.

Also located in the left corner are map navigation tools.
If the user chooses to do so, they can move left, right, up or down by clicking on the individual directions. To zoom in or out click on the + or -.

Map navigation can also be obtained by clicking on an area on the map, holding down the left mouse button, and sliding the mouse in the desired direction. Zooming in and out also responds to the roller wheel available on some mice.

Click the center dot to relocate the map to your default location. You can change your map default location by using the navigation tools to position the map zoom and location. Then click the “User Settings” cog and “Save”.

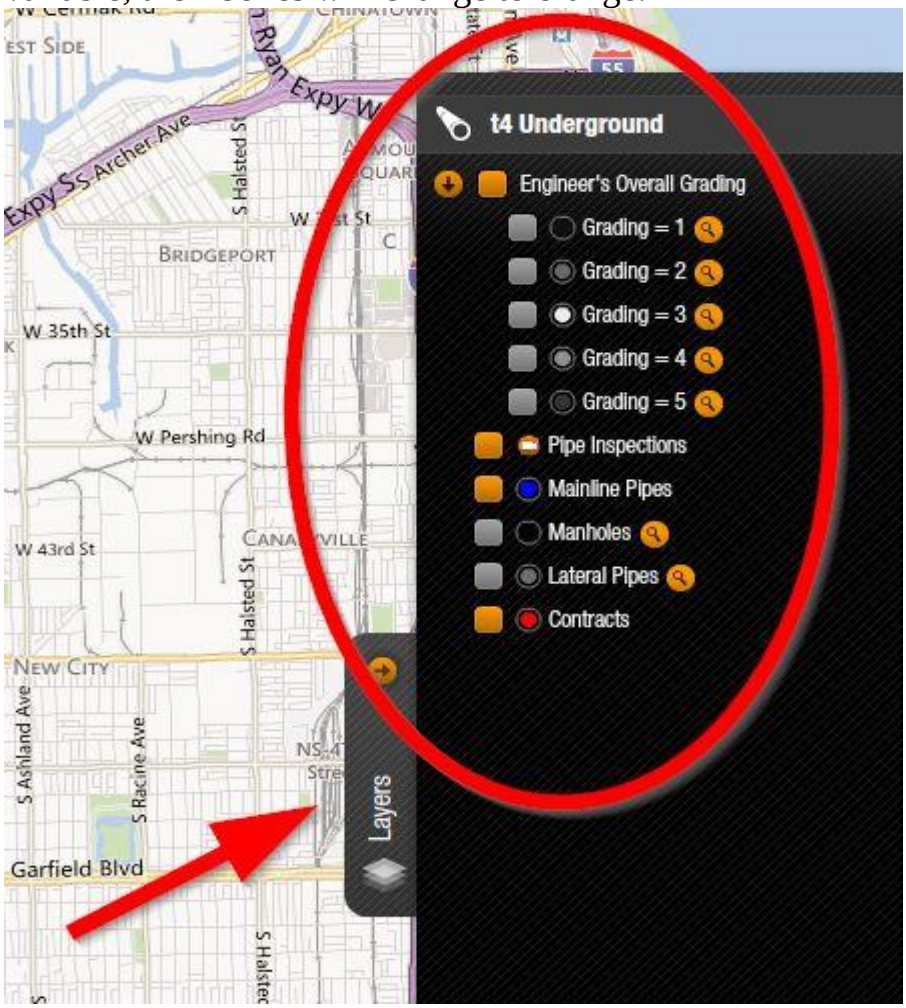


Then no matter where the map is shifted to clicking the center dot will relocate the map to your personal default.

8 The Layers Tab

Located on the right side of the screen is the Layers tab. ***Layer*** refers to the individual layers of information that can be viewed when looking at the map.

When first logging in, some items on this tab will have orange boxes while others have grey boxes. Zooming in on the map will allow for all layers to become available. As they become available, their boxes will change to orange.



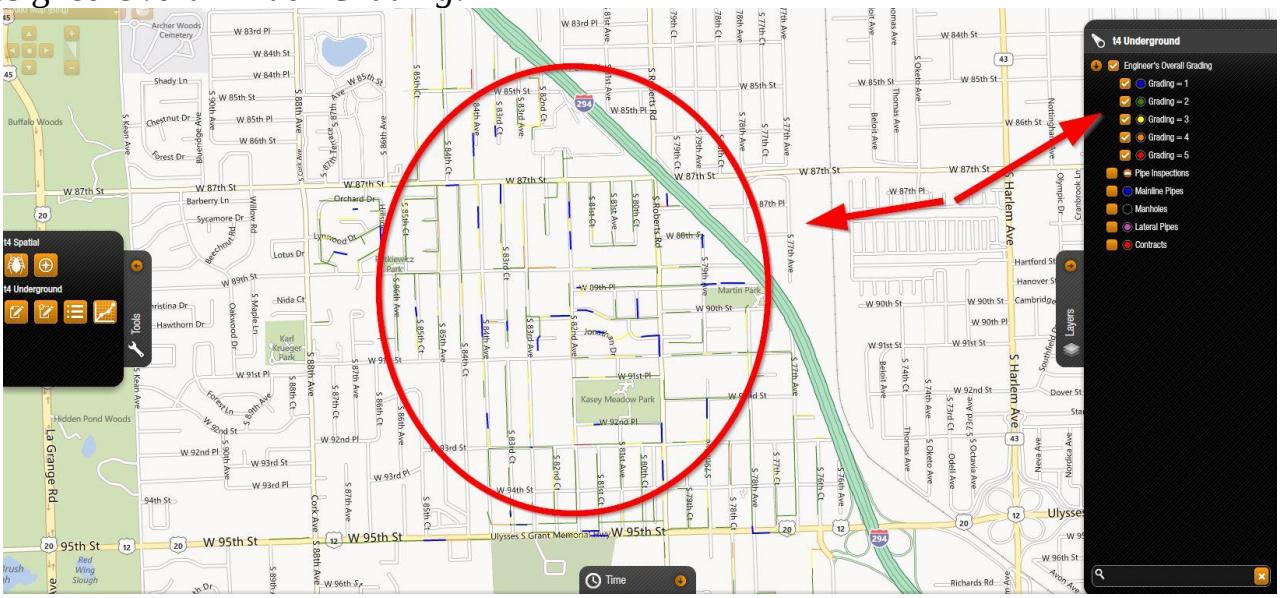
The available layers are:

- ***Engineer's Overall Grading***
- ***Pipe Inspections***
- ***Mainline Pipes***
- ***Manholes***
- ***Lateral Pipes***
- ***Contracts***.

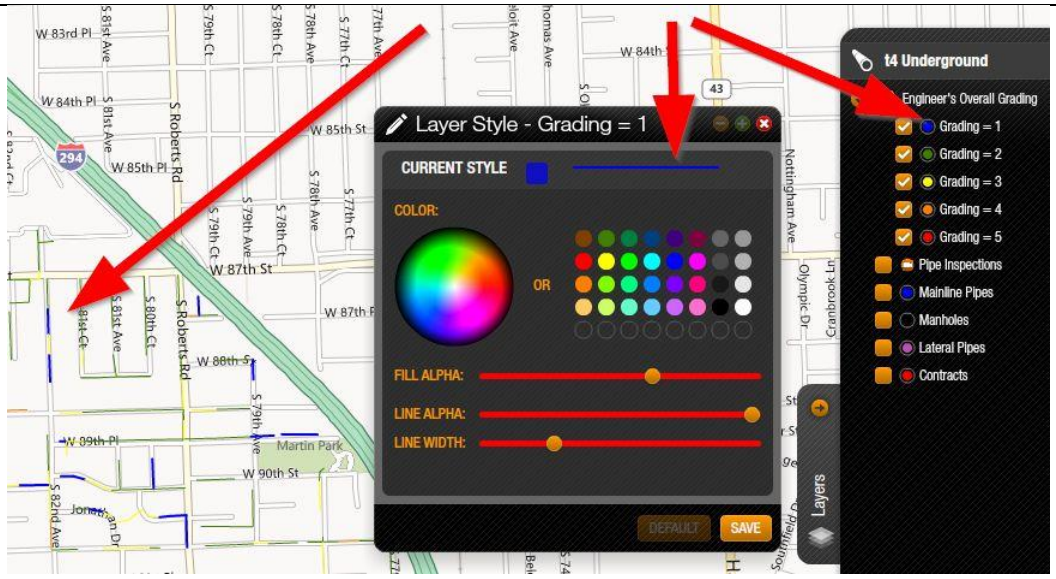
8.1 Engineer's Overall Grading:

Clicking the in front of the ***Engineer's Overall Grading*** turns on the PACP grading layer. T4 will place a checkmark in the orange box to indicate that this layer is turned on. Clicking again will remove the checkmark and turn off the grading layer. These gradings are the same as seen in both the ***Inspections List*** as well as the ***T4 Inspection Interface***. If any adjustments have been made to the gradings, they will also be reflected in the grading layer.

To the left of the box is a drop down arrow that when clicked allows the user to view the specified colors for the individual gradings. These are based on the PACP assigned *Overall Index Grading*.



Each ***grading*** is an individual layer and allows for the user to turn on and off the layers of their choosing by clicking on the box. The colors of the individual grading layers can be changed by clicking on the colored circle in front of the chosen grading.



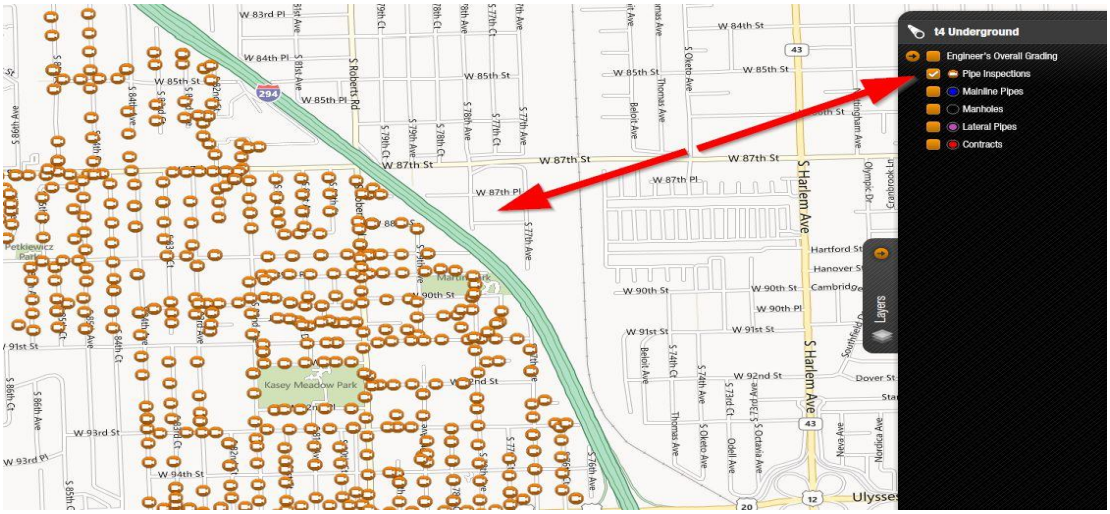
Doing so will bring up the ***Layer Style*** tab, allowing the user to choose the preferred colors, and adjust the line width by sliding the circle to the right. The changes will be reflected at the top of the box under ***Current Style***.

Click SAVE to temporarily change the line colors for current viewing.

Selecting the close button will close the T4 Inspection Interface.

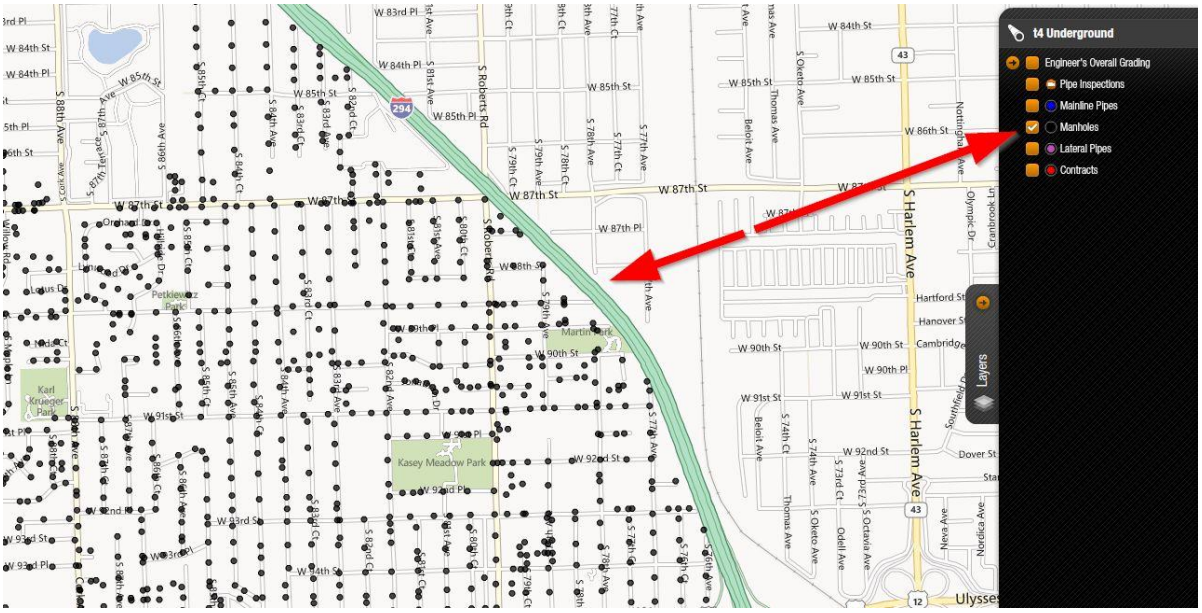
8.2 Pipe Inspections Layer

The ***Pipe Inspections*** layer can be turned on by clicking on the in front of the pipe inspections.



Users can review videos using the ***T4 Inspection Interface*** by clicking on the ***Video Review*** button on the map.

By clicking on the ***manhole*** layer box, the map will be populated with all manholes that were included with the individual shape file provided to T4 during the set up of the contract.



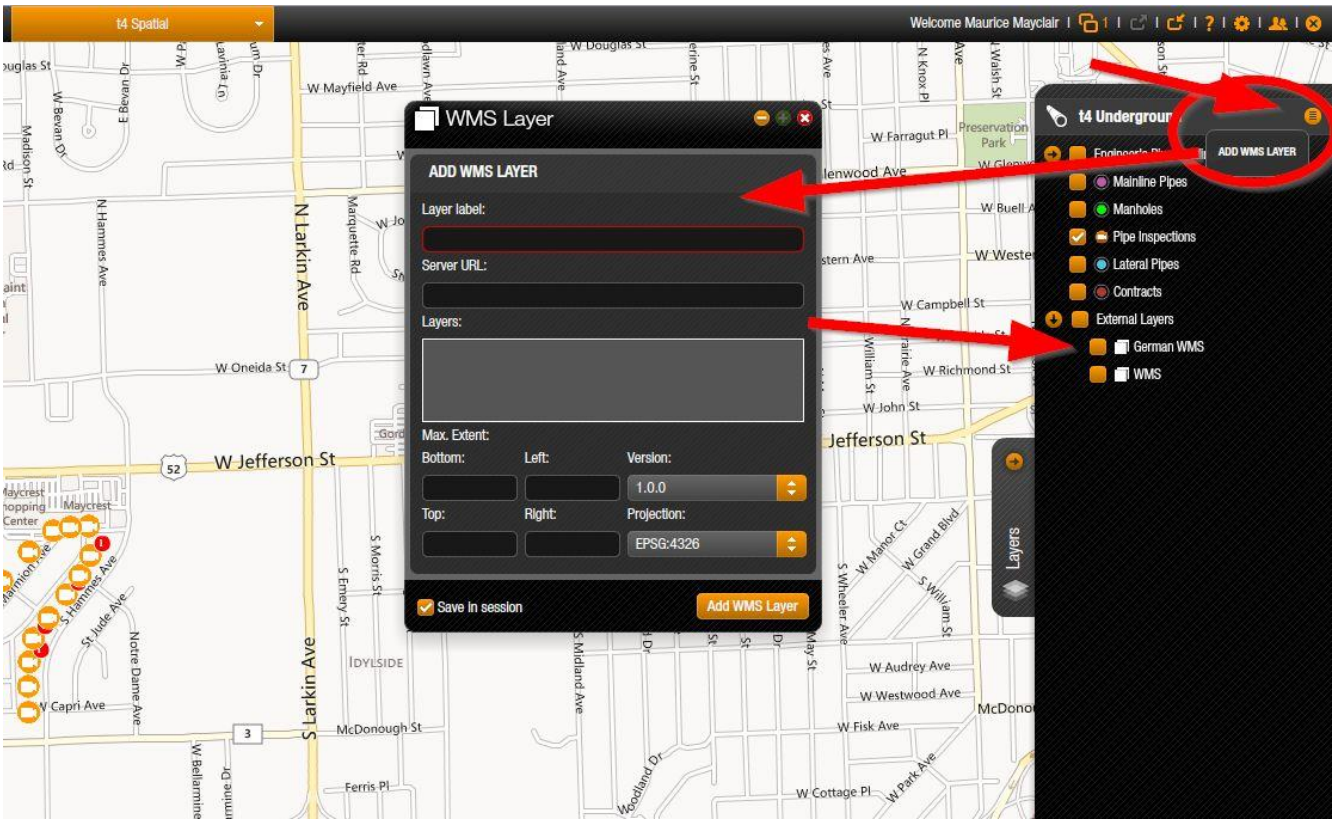
Adjustment to the colors of the manhole symbols can be adjusted by clicking on the colored symbol to the right of the checked box.

Checking the ***Mainline Pipes*** box will populate the map with the individual pipes.

Adjustment to the colors of the mainline pipes can be adjusted by clicking on the colored symbol to the right of the checked box.

8.3 External Layers (WMS)

WMS services can also be added as new layers as per the sequence below.

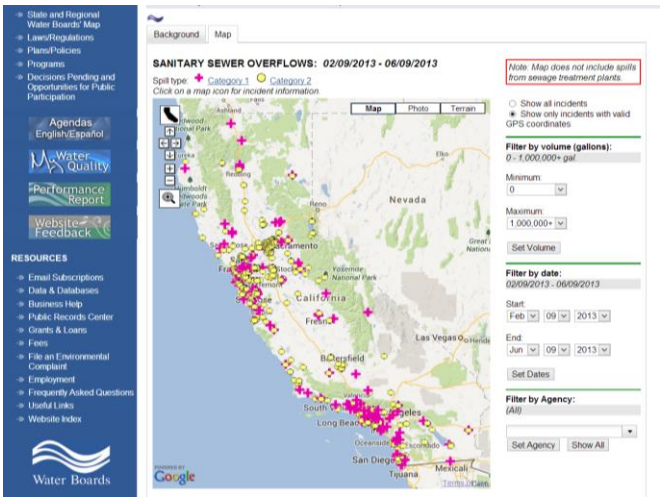


It is now possible to import dynamic external layers from your own or other publicly available GIS systems using Open Geospatial Consortium (OGC - http://www.opengeospatial.org/) compliant Web Mapping Services (WMS).

"The OpenGIS® Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application."

These services allow you to query and load contextual information, such as the worked example of publicly notifiable Sanitary Sewer Overflows (SSO), from directly within t4 Underground.

This information is publically accessible from here:
http://www.waterboards.ca.gov/water_issues/programs/sso/sso_map/sso_pub.shtml



but is made available for further analysis in different formats here
http://www.waterboards.ca.gov/water_issues/programs/sso/docs/index.php
and here
http://gispublic.waterboards.ca.gov/ArcGIS/rest/services/Water_Quality/Sewer_Overflows/MapServer.

It is this last source that allows us to import the data into t4 Underground.

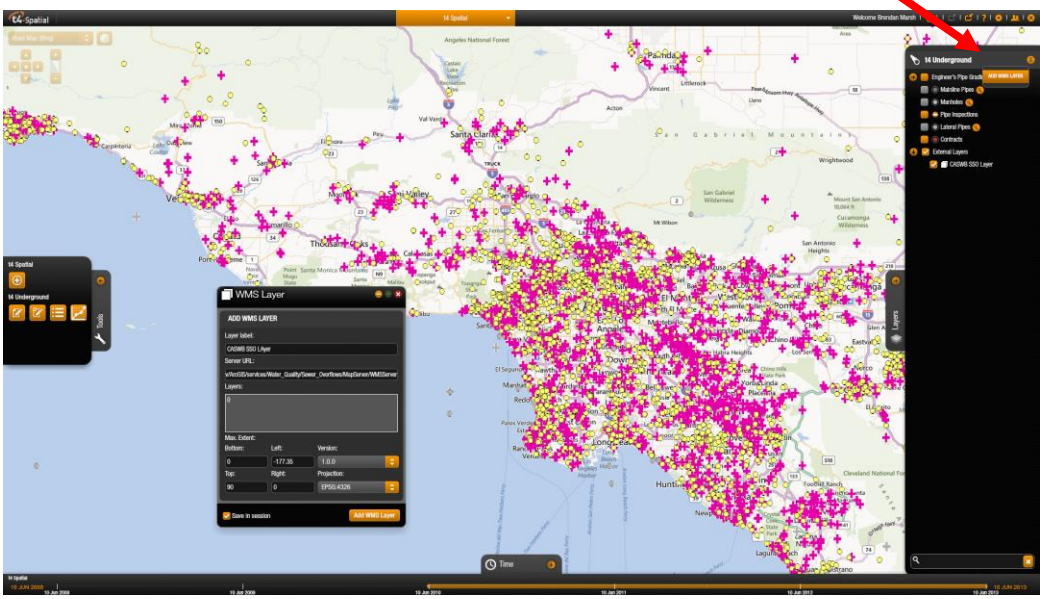
All WMS services require several pieces of metadata in order to allow results to be correctly represented in a mapping system, they are:

FIELD	DESCRIPTION	WORKED EXAMPLE
Name	The name you wish to gives this map layer with t4 Underground	California State Water Board SSO Layer
URL	The link to the data source	http://gispublic.waterboards.ca.gov/ArcGIS/rest/services/Water_Quality/Sewer_Overflows/MapServer
Layers	The value of the Layers parameter is a comma-separated list. Use "0" to select all layers.	0
Top Coordinate	The northernmost edge of the results bounding box	90

FIELD	DESCRIPTION	WORKED EXAMPLE
Bottom Coordinate	The southernmost edge of the results bounding box.	0
Left Coordinate	The westernmost edge of the results bounding box.	-178
Right Coordinate	The easternmost edge of the results bounding box.	0
Version	The WMS Specification version named by the source	1.1.1
Projection	The Co-ordinate Reference System named by the source	EPSG: 4236

The above information is almost always listed on public webpages describing the WMS datasets available within them.

The functionality itself is accessed from top of the Layer Menu and defined in the window that appears.



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